

# Solar District Energy Project



**DISTRICT ENERGY**  
ST. PAUL™

# Saint Paul's Community Energy System

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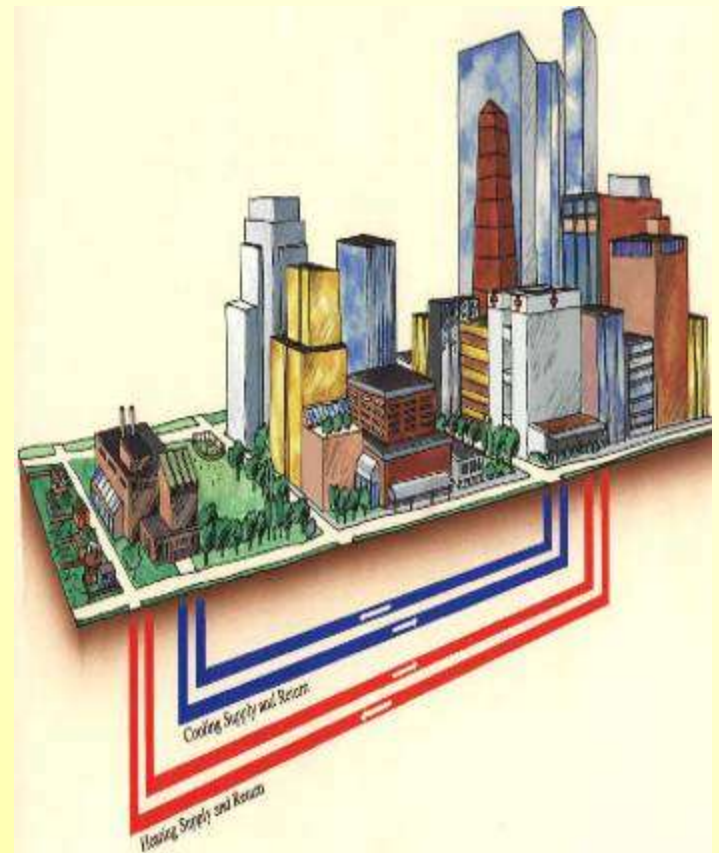
- Serving **Saint Paul** customers since 1983
- **North America's** largest hot water district energy system
- **Minnesota's** leading biomass, renewable energy system
- **National Model** for integration of renewable energy and combined heat & power.



# District Energy 101

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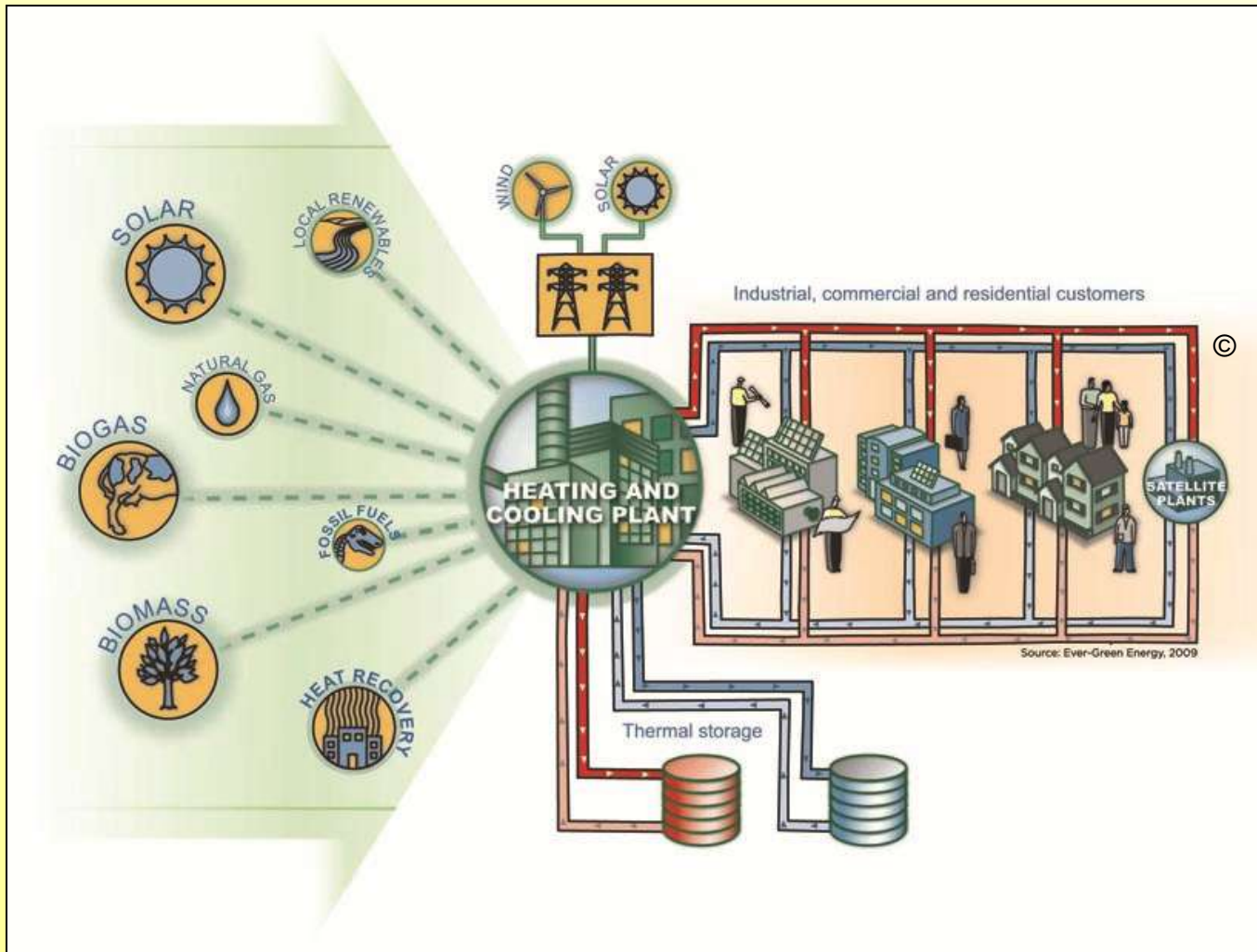
- Underground pipes connect users to flexible fuel sources, including solar
- Systems utilize steam, hot or chilled water
- Efficient delivery and consumption of energy



Courtesy: International District Energy Association



# Project Goal: Integrated Energy



# Project Goal: Large-Scale/Thermal

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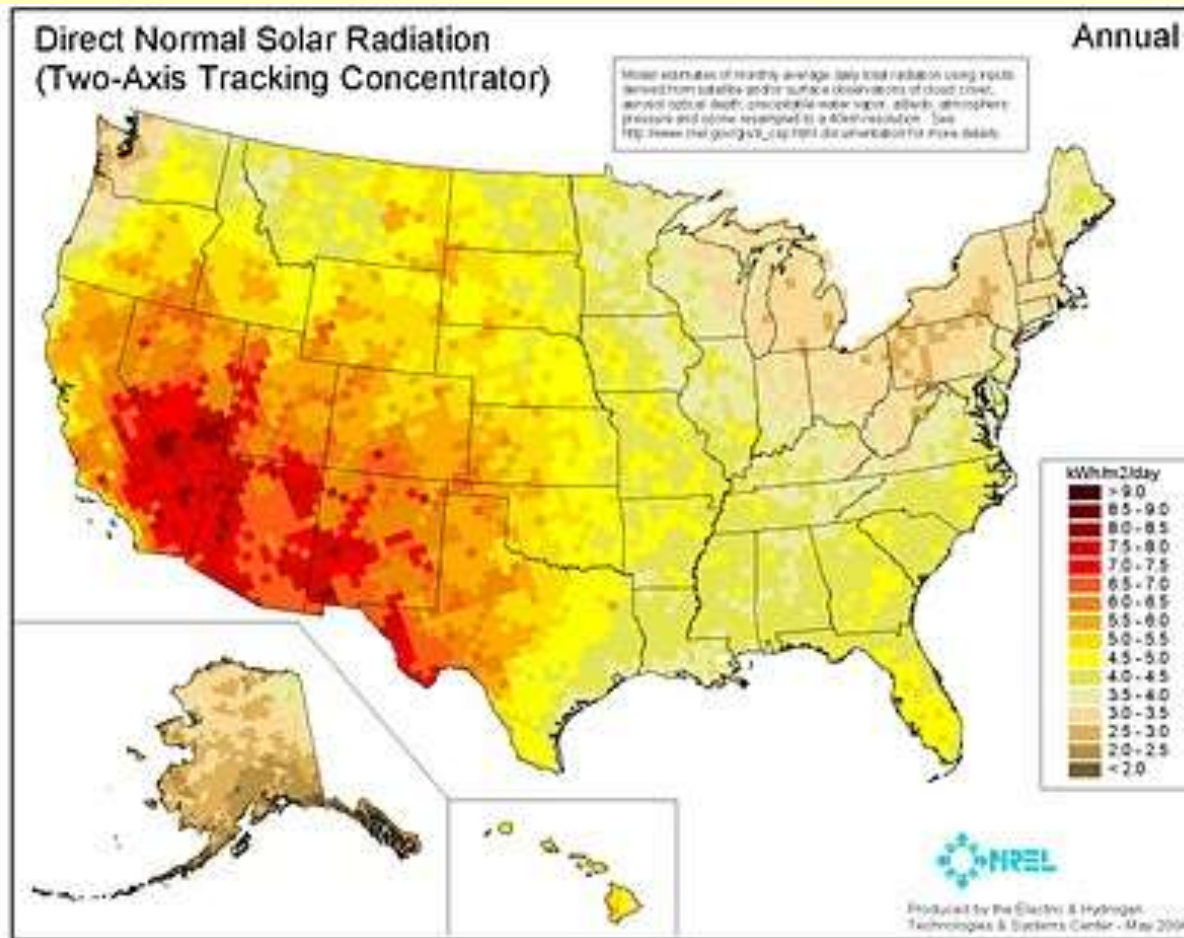
Kungälv, Sweden



Graz, Austria



# Project Goal: Midwest Solar Potential



# 2009 Award

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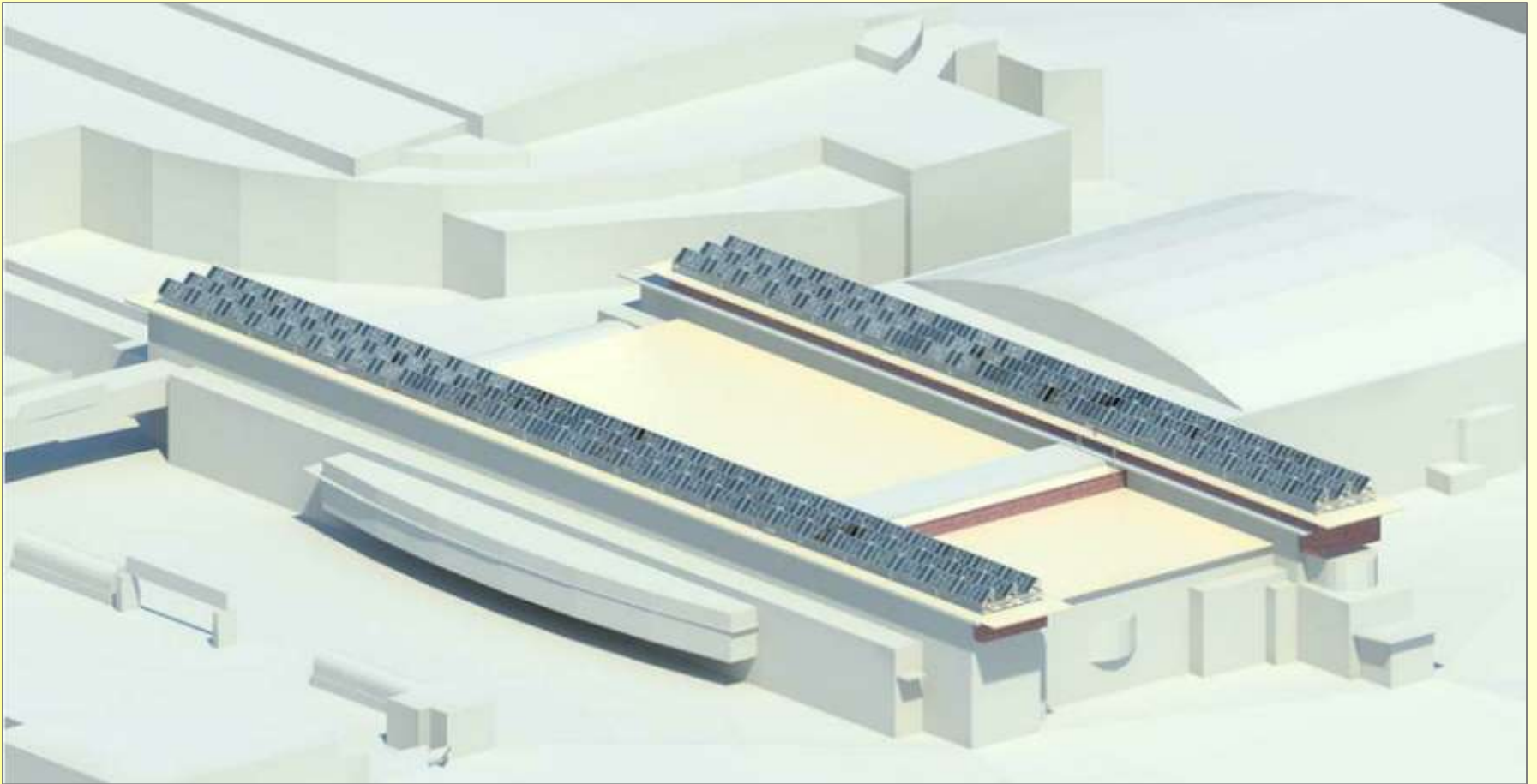
# Installation Site: Saint Paul RiverCentre

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# 2010 Design & Engineering

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Design and Engineering: TKDA



# 2010 Installation

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# 2010 Installation

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# About the Installation

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- Peak energy production of 1 Megawatt.
- Produces an estimated 1,200,000 kWh.
  - Average MN homes consume 24,000 kWh per year.
- 21,000 Square feet of panels.
- Installation covers 30,000 square feet.
- 220,000 lbs of Structural Steel.
- 1600 linear feet of pipe.



# About the Collectors

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- 144 commercial-grade flat plate collectors
- Maximum efficiency technology.
- Convert 80% of the absorbed sunlight into thermal energy
- Crucial Operating parameters:
  - Starting Efficiency: 75.4%
  - Heat Loss Coefficient: 2.035 W/(C°\*m<sup>2</sup>)
  - Operating Temperature: 195°F



# About the Collectors

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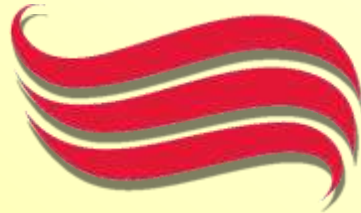
# Next Steps

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- Operational by January 2011
- Commissioning Spring 2011
- Reporting in 2012
- Explore market transformation
  - Site characteristics
  - Independent districts
  - Manufacturing opportunities
- Community and industry education



*Thank You!*



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